



# **TRINITY COLLEGE FOR WOMEN NAMAKKAL**

**DEPARTMENT OF NUTRITION & DIETETICS**

## **SANITATION AND HYGIENE IN FOOD INDUSTRIES EVEN SEMESTER**

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# CLEANING AND SANITATION IN DAIRY INDUSTRY

## INTRODUCTION

Cleaning is the process of removing food and other types of soil from a surface, such as utensils and equipments used in dairy and food industries etc. Cleaning is accomplished using a cleaning agent that removes food, soil, rust stains, minerals, or other deposits. The right cleaning agent must be selected because not all can be used on food-contact surfaces. (A food-contact surface is defined as a surface of equipment or utensil with which food normally comes into contact or a surface of equipment or a utensil from which food may drain, drip, or splash into a food or onto a surface normally in contact with food.) Sanitation of a food-processing plant involves keeping product contact surfaces of utensils and equipment clean and sterile. Clothing, air, packing materials, and product non contact surfaces of equipment, floors, walls, and ceilings must be sanitized to minimize contamination of the products from these sources.

## SANITIZING MATERIAL

### **Water**

As a solvent, water carries both dissolved materials in solution and suspended materials including soil components. Water serves as a means of applying physical force during rinsing, surging, and jetting. It is the medium through which heat is applied during cleaning. The physical, chemical, and microbiological properties of the water supply are important when used for the sanitation of the dairy-processing plant.

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## Heat

It is important in cleaning and sterilizing dairy equipment. It increases both the speed of chemical actions and the dissolving capacity and solute holding capacity of water. If present in sufficient quantities, heat can destroy the viability of microorganisms. In hand washing procedures the amount of heat must be rigidly limited to prevent discomfort or injury to the workers hands. In mechanical washing procedures more heat is used. Its use must be controlled; however, to assure that cleaning is not made more difficult by hardening any soil on the product contact surface, and that the equipment surface or surface materials are not damaged. The cleaning solution is warmed or heated with steam. Steam can be used either to heat product contact surfaces so they dry quickly after washing or to sterilize such surfaces. A jet of steam is sometimes used to provide physical force surge and mix washing solutions in addition to heating them

## **Chemicals are used in sanitation procedures for two principal reasons**

1. To change soil so as chemically to soften, disperse, or dissolve it.
2. To destroy the viability of microorganisms. These chemicals are either detergents or sterilants.

### **Detergents**

Detergents include soaps, inorganic alkaline materials, acids, organic surface active or wetting agents, chelating chemicals, sequestering agents, sterilants, emulsifiers, colloids, abrasives, and inhibitors. The detergents to be used are selected according to the type of soil to be removed, the characteristics of the materials of which the soiled surface is made, the cleaning facilities and procedures to be employed, the characteristics of the water, and the cost of the detergents.

## **Soaps**

Soaps are used mainly for washing clothes, floors, walls, and windows. They are not suitable for product contact surfaces because they leave a film which is difficult to remove and which may leave undesirable flavors or odors which are absorbed by the product. Mild soaps are excellent for washing hands, and should always be available in the milk-processing plants for this purpose.

## **Alkaline detergents**

These are generally available and economical. The more common of these are sodium hydroxide or caustic soda ( $\text{NaOH}$ ); sodium bicarbonate, ( $\text{NaHCO}_3$ ); sodium carbonate or soda ash ( $\text{Na}_2\text{CO}_3$ ); sodium sesquicarbonate ( $\text{Na}_2\text{CO}_3 \cdot \text{NaHCO}_3 \cdot 2\text{H}_2\text{O}$ ), and trisodium phosphate ( $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$ ). Others have more recently come into use for specialized cleaning purposes. Two of these are sodium meta silicate ( $\text{Na}_2\text{SiO}_3 \cdot 5\text{H}_2\text{O}$ ); and sodium hexametaphosphate, ( $\text{NaPO}_3$ )<sub>6</sub>.

## **Acids**

Acids have come into increasing use as dairy detergents. They are generally used in weak solutions of about 0.1 % or slightly more. Those more commonly used are phosphoric and nitric acids.

## **Surface active agents**

Surface active agents are those which include such materials as sodium alkyl sulphates and quaternary ammonium compounds. These materials help a detergent solution at surfaces or interfaces to spread the solution and to penetrate the soil.



## **Chelating agents**

These are used along with other detergents, especially in hard water. They react with metallic ions, particularly Iron and copper, to form soluble compounds. Ethylene diamine tetra acetic acid and its sodium salts are frequently used as chelating agents. Chelation can be thought of as a selective form of sequestration. The action of sequestering agents is similar to chelaters, but involves a greater variety of ions including heavy metals and earth alkalies. Polyphosphates are often included in dairy detergent formulae for their sequestering properties.

## **Emulsifiers**

Emulsifiers strengthen the ability of the solution to hold unsaponified fat which may be released from the product contact surface during the cleaning process. Materials which are suspended and emulsified pass out readily with the wash or rinse water.

## **Abrasives**

These are irregular hard particles of sand, pumice used for grinding, abrading, or polishing. They might be included in a detergent mixture for very special uses such as cleaning floors or walls. Unless properly selected, especially for particle size, and properly used, they will etch and abrade most surfaces making many of them more difficult to clean properly thereafter. This action is particularly undesirable on a product contact surface.

## **Inhibitors**

Inhibitors prevents chemical action between two materials. They are used in dairy detergents to protect aluminum and tin surfaces from alkali or acid detergents. Sodium metasilicate is used to protect aluminum; concentrations of up to 0.5% in the washing solution are suggested. For the protection of tin, sodium sulphite can be used in concentrations of 0.25% or slightly more in the washing solution.

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